

EVENTS

CALENDAR

NOVEMBER

18-20 Oklahoma Turfgrass Conference, Tulsa Convention Center, Tulsa, OK. Contact: Michael Kenna, Oklahoma State University, 360 Agriculture Hall, Stillwater, OK 74078, (405) 624-5414.

DECEMBER

2-3 Alabama Grounds Manager's Certification Program, Bessemer State Technical College, Bessemer, AL. Contact: Fred Kapp, Bessemer State Technical College, PO Box 308, Bessemer, AL 35021, (205) 428-6391.

7-10 Ohio Turfgrass Conference and Show '87, Ohio Center, Columbus, OH. Contact: Ohio Turfgrass Foundation, 2021 Coffey Rd., Columbus, OH 43210, 614-292-2601.

7-10 New Jersey Turfgrass Expo '87, Resorts International Hotel, Atlantic City, NJ. Contact: Dr. Henry Indyk, Soils and Crops Dept., P.O. Box 231, Cook College, New Brunswick, NJ 08903, (201) 932-9453.

14-16 Texas Turfgrass Association Conference and Show, Hyatt Regency and Albert Thomas Convention Center, Houston, TX. Contact: Shirley Duple, TTA, 1003 Howe, College Station, TX 77840, (409) 693-1656.

16-18 Desert Turfgrass Conference and Trade Show, Las Vegas. Contact: Bob Morris, Nevada Cooperative Extension, ST&P Building, 953 E. Sahara, Las Vegas, NV 89104, (702) 731-3130.

JANUARY

6-8 North Carolina Turfgrass Conference and Exhibit, Winston-Salem, NC. Contact: J.M. DiPaola, Box 7620, North Carolina State University, Raleigh, NC, 27695

THE FRONT OFFICE

OPINION PAGE

A PLEASANT DIVERSION



My first recollection of turf was not on a baseball diamond, football field, golf course or park. It was the short-cut bent-grass on the bowling green at Spalding Inn in Whitefield, NH. I recall sitting on the bank beside the green for hours as my uncle bowled.

I had no idea why everyone was dressed in white or why they'd roll these odd-shaped balls to one end of the green, just to roll them back a few minutes later. I just knew that if I asked too many questions or caused a disturbance, my uncle, who was headmaster of a private boys school in Boston, would apply discipline promptly. So my brother and I would quietly look for toads

hiding in their burrows underneath the hedge surrounding the green.

My uncle wasn't rich, but he was always invited to bowl in the summer or curl during the winter with the well-to-do parents of his students. They could afford the month-long stay at the Inn four hours northwest of Boston by car or train. They had "old money" as my mother would say.

The Inn and the bowling green have stuck in my memory all these years as sort of a pleasant diversion from the typical suburban life most of us live today. So when I started to work on the story in this issue on lawn bowling and croquet, old memories came back to mind. I wondered if these genteel sports were still the exclusive privilege of the wealthy, or whether time and the growth of affluence in this country had brought new popularity to them.

What I found was that these sports are growing as fast as new greens can be built at resorts, country clubs and parks. They are within reach of everyone who can afford a country club membership, a week at a resort or a winter in the Sunbelt. That is significantly more people than just 30 years ago—millions more.

I also discovered that croquet and bowling green maintenance is a full-time job for one "greenskeeper." It takes specialized equipment and a fairly good understanding of soils and turf care. You don't just take a relatively flat spot and mow the turf down to its crowns. Expertise is required and that level of expertise is beyond that found in volunteers or club members. In other words, bowling and croquet greens require professional maintenance.

My conclusion is that there is tremendous potential for sports turf managers to promote these two sports, once unavailable to the general public, to a much larger group of people. In the space of two tennis courts, you can provide the users of your facility with the same pleasant diversion that was once available only to a few at Inns and private estates. Only you can build or maintain these greens as they need to be. In the long run, that makes you more valuable to your employer, whether that is a greens committee, park district or hotel.

It's also quite apparent that public park systems have to justify the expense of providing high-maintenance turf for any type of sport. Until and unless specialty sports have the support of the taxpayer, clubs are going to have to pay the bill for both construction and maintenance of greens. You can't build these kinds of facilities and let them deteriorate for lack of maintenance dollars.

The recreation industry has changed tremendously in the past three decades. Americans are constantly looking for new sports to try. They are also willing to pay for these sports if the price is made clear up front. The best thing the sports turf manager can do is let his management know about these sports and to give them accurate estimates of both construction and maintenance costs. You might be surprised, they just might say, "Go ahead, we'll back you all the way."

It's not unrealistic to think that one day you might be dressed in white, bowling on a fine-cut green with your nephew watching from the edge of the green. Your expertise, not your money, will make it possible.

Bruce Shank

The Americanization Of Lawn Bowling and Croquet

Peek through the hedges of a park in England or Scotland on a nice summer day and you'll see an orderly group of people decked out in their "whites" bowling or playing croquet. The turf on the greens appears as if it were scalped by a poorly adjusted mower. But you don't hear complaints from the players. All they care about is that the green is fast, smooth and dead level.

The British have taken these genteel sports with them around the globe to Australia, India, South Africa, and Canada. In these countries lawn bowling and croquet caught on with a passion with thousands of players spending many hours each week at the greens. Their acceptance in the United States has been limited, but that may be changing.

Lawn bowling and croquet have been restricted in this country to the affluent elderly or "leisure class" who have access to bentgrass or bermudagrass greens at private estates, country clubs, resorts or parks. Due to the cost of properly constructed and maintained greens, it's doubtful whether they will ever be sports for the masses. But, the barriers of class, wealth and age are beginning to fall. The potential exists to build thousands of greens at golf courses, parks, resorts and athletic clubs that currently have the expertise needed to build and maintain them.

Despite the recreational boom in the U.S., many potential players have overlooked these participant sports in which youth, sex or physical condition provide no advantage. Members of the American Lawn Bowls Association (ALBA) and the United States Croquet Association (USCA) believe that once lovers of the outdoors try their sport, they'll be hooked.

Jack Osborn, president of the USCA, says the number of serious U.S. participants in croquet has been multiplied by 50 in the last ten years. "Croquet is apparently fulfilling an important need heretofore unaddressed," claims Osborn. "Scores of folks, from college undergrads to retirement community residents, have discovered the social, recreational and competitive rewards of croquet. Clubs, resorts and hotels have recognized that croquet is a fresh answer for their members or guests seeking new outlets for participation beyond golf or tennis." These facilities are reaching out to enlarge their range of activities by adding croquet at a relatively low cost.

Osborn explains that the game is quite



A member of the U.S. Croquet Team concentrates during the Challenge Cup against England held at PGA National. The match was the highlight of the dedication of the USCA headquarters.

different from the version played by many Americans in their back yards as children. "The very look of the sport and that of the turf on which it is played has changed significantly." Larger balls now pass through increasingly narrow wickets set firmly into trimmer and faster greens. Gone are the short mallets, the old wooden balls and the wickets made of coathanger wire. Replacing them are handcrafted sets ranging in price from \$200 to \$1,200, a nice side line for any pro shop. But, it's the 84 by 105 foot, absolutely level, golf-quality greens that most clearly distinguish the back yard game from the sport.

Quality greens, sophisticated equipment, established rules, accepted handicaps and national tournaments governed by USCA have placed new emphasis on skill and competition. U.S. teams now compete as equals against teams from England, Scotland, Canada, Bermuda and South Africa. More than 250 clubs with 3,000 members look to USCA headquarters at PGA National in Palm Beach Gardens, FL, for assistance and support.

While USCA has begun to build American involvement in the sport of croquet, the American Lawn Bowls Association has



The Lakeland, FL, Parks Department provides three greens for lawn bowling from Canada.

helped raise the standard of bowling in this country for more than 25 years. The game, developed in Scotland centuries ago, is vastly different from alley bowling, a popular sport played indoors in the U.S. There are no pins and the bowls (balls) are smaller and biased in shape, not round. The object is for a team to get the most bowls closest to the jack, a heavy white ball rolled down the rink to start the game.

"There is a considerable amount of strategy in bowling," explains Dr. Edgar Haley, M.D., a retired surgeon who is the leading expert on bowling green construction and maintenance in the U.S. and Canada. Teams consist of one to four bowlers. Each bowler has a definite role to play, from the initial roll of the jack (a white bowl that becomes the target) to using each bowl to get his team's bowls closest to the jack. "It's almost like playing chess on grass, anticipating the other team's next move and devising a strategy to stop it."

The odd-shaped bowls do not roll as predictably as a round croquet ball does. It takes a definite knack to control the roll of the bowl. Once a bowler develops this knack, he becomes intolerant to surprises caused by inconsistencies in a green. "A bowling green must be absolutely flat, fast and smooth," says Haley. "The better the green, the more challenging and enjoyable the sport is. Greens have improved greatly during the past 15 years. As a result more people are taking the sport seriously."

The most important fact about bowling and croquet greens is the ball or bowl does not travel on top of the turf like a golf ball. Instead it is supported by the soil, bending the turf out of its way as it rolls. For this reason, imperfections in the soil surface or accumulation of thatch is highly undesirable. The surface can't undulate like a golf



Golf professionals and guests of the PGA Sheraton Resort Hotel play croquet at the greens next to USCA headquarters.

green. Since it must be perfectly flat, it has to have superior drainage. Any grain in the turf, usually cut at 3/16 inch, is prevented by changing the direction of cut for every mowing. Furthermore, greens are verticut frequently, every other day in some cases. Special verticutting and mowing equipment is used to achieve the highest quality greens possible.

The bowling green is a 120-foot-wide square (up to 132 feet) surrounded by a ditch and a bank. The game is played in rinks, which are between 14 and 19 feet wide extending the length of the green. This provides for seven or eight games per green. The direction of play is changed 90 degrees every day to prevent localized worn spots.

Bowling greens and grass tennis courts can actually be used for croquet. Two grass tennis courts occupy a 120-foot-wide square similar to a bowling green. The 84 by 105 foot dimensions of a croquet green fit with the outer borders of both. USCA's Osborn states, "Quite a few clubs and resorts use grass tennis courts and bowling greens to add croquet to their list of available sports. It helps justify the cost of maintaining these areas and provides another sport to attract guests and members. It's also a reason why croquet has grown so rapidly."

The Beverly Hills, CA, Park and Recreation Department spent nearly \$200,000 to rebuild three bowling greens at Roxbury Park in 1986. "Walt Disney and other Hollywood notables used to bowl on the greens at Roxbury Park," boasts Marcelino Lomeli, city park superintendent. "Our bowling club continues to be very active and an important part of the community."

Dr. Haley and his brother used to bowl at Roxbury Park in the '50s. "When I heard they were going to rebuild the greens, I was pleased to help landscape architects Erik-

son, Peters and Thoms with details," Haley said. "I'll never forget installing those greens," says Mickey Strauss, president of American Landscape, Inc., Canoga Park, CA. "There was less than 1/8 inch tolerance in the sand greens. We had to section the greens off and install the sand as if we were pouring concrete. Beneath the sand was an intricate drainage system that was also flat. We've built golf greens before, but the bowling greens were a lot tougher from the standpoint of tolerance. Dr. Haley wrote the book on bowling green construction and we wanted to make sure he was satisfied with the final results."

"There are less than 20 bowling greens in the U.S. and Canada built completely with sand," Haley pointed out. "Twenty years ago there were no real standards for construction. While I had bowled nearly all my life on all types of greens, it wasn't until I retired that I decided the game could be improved if specifications were developed. So I called the University of California at Davis to find out how our greens could be improved. I was referred to Dr. William Davis in the Department of Environmental Horticulture, who introduced me to the concept of sand rootzones. With the help of Dr. Davis and publications by Dr. John Madison, Dr. Vic Youngner, Dr. James Beard and Dr. William Daniel, I put together a booklet on bowling green construction."

Haley's book, which is now in its third edition, covers everything from sand selection to irrigation. "The key to a healthy green centers around the amount of moisture and oxygen available to the bentgrass or bermudagrass roots seven inches below the surface," Haley summarizes. "A deep root system enables the turf to withstand the short cutting and regular verticutting neces-



bowling greens for more than 400 winter residents

Lawn Bowling and Croquet

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sary to provide a flat, smooth and fast surface." Most recently Haley has demonstrated that removing thatch is more important to green speed than the height of cut. "When the stress on the grass due to low mowing is relieved, the strength of the turf is tremendously increased." Haley has maintained satisfactory speed with bentgrass mowed as high as 7/16 inch with little to no thatch.

Haley's design involves 16 inches of washed and sized sand on top of a flat network of drainage pipe. The Roxbury Park greens also contain a sophisticated moisture sensing system using Irrrometer sensors connected to a Motorola computerized central controller. When the moisture sensors installed seven inches deep in the sand signal the MIR-3500 controller that a preset amount of moisture exists, the controller stops the irrigation cycle.

Haley practices what he preaches at the Escondido Lawn Bowling Club in Escondido, CA, and at his summer residence in Prince George, British Columbia. "We only have an eight week growing season in Prince George in the summer," states Haley. Still Haley verticuts the Penncross every ten days. He covers the green with clear plastic to keep the bentgrass growing as long as possible. During the winter Haley becomes the greenskeeper for the Escondido club. He recommends overseeding Tifgreen hybrid bermudagrass with Penncross in the fall to protect it. "Bowling on dormant bermudagrass can damage the crown of the bermudagrass plant," says Haley. "Of course, overseeding is unnecessary if you can keep the bermudagrass actively growing."

Haley looks to Australia for much of his equipment. "There are more than 400,000 lawn bowlers in Australia," he points out. "As a result, they take maintenance of the greens quite seriously." He imports a mower from Australia called a Scott Bonar. The 30-inch-wide electric mower cuts the turf with a ten-blade reel. Each blade of grass is cut four times per mowing. During the first pass the mower overlaps the previous cut by half. Then the green is cut the same way at a 45 degree angle to the first cut.

Haley went so far as to invent his own verticutter for bowling greens. Called a Haley Planer, it consists of a verticut reel, mounted below a small tractor on a six foot long frame, with skids that keep the blades level with the surface of the green at all times. In lieu of a "Planer," Haley recommends a Ryan Ren-O-Thin or Mataway. "The verticutter is extremely important when you consider bermudagrass greens should be verticut three times per week in the summer and twice a week in the fall and spring," explains Haley.

Bill Tinsley, assistant director of parks and recreation for the City of Lakeland, FL, is an avid fan of Haley. Lakeland is a popular winter home for hundreds of Canadian lawn bowlers. The Lakeland Bowling Club, which plays at three different greens provided by the Lakeland Parks Department, has



To come within a 1/16 inch tolerance on the greens at Roxbury Park, the crew from American Landscape Inc. installed the sand like they would concrete.

nearly 400 members in the winter and 65 in the summer. "Bowlers represent an important part of the Lakeland economy during the winter," Tinsley states. In fact, the sport is important to the entire state which has more than 20 bowling clubs with thousands of members.

While Tinsley has high regard for Haley, he is trying a few methods of his own to keep the Tifgreen greens in shape. The single greatest demand a player has on the greens is their speed. "The players will come out and time the rolls before the matches," Tinsley says. "A nine-second roll would be terrible; an 11 second roll excellent." Tinsley keeps the speed on the greens in the excellent category by grooming the turf each time he mows. A small verticut attachment on the front of the Jacobsen walking greens mower lightly verticuts the bermudagrass. Four times a year the greens are heavily verticut with a Ren-O-Thin.

Speed is also the reason Tinsley does not overseed the greens for the winter. Instead he carefully supplements his slow-release fertilizer program with biweekly applications of ammonium nitrate to keep the bermudagrass out of dormancy. "If we get a surprise freeze, we can apply ammonium nitrate and the bermudagrass bounces back in about a week," he explains.

The biggest threat to the greens is the mole cricket, states Tinsley. "I have nightmares about mole crickets," he admits. "They spend the whole day waiting for us to turn on our lights for night play, and then they come swooping down on us. They could put us out of business in a week with the divots and mounds they burrow." So he can sleep at night, Tinsley makes a preventative treatment with Oftanol insecticide in the summer. Problem areas are spot-treated throughout the year.

Tinsley is very cautious with moisture on



The Haley Planer is a verticutter centered on a six-foot-long frame built for bowling greens.

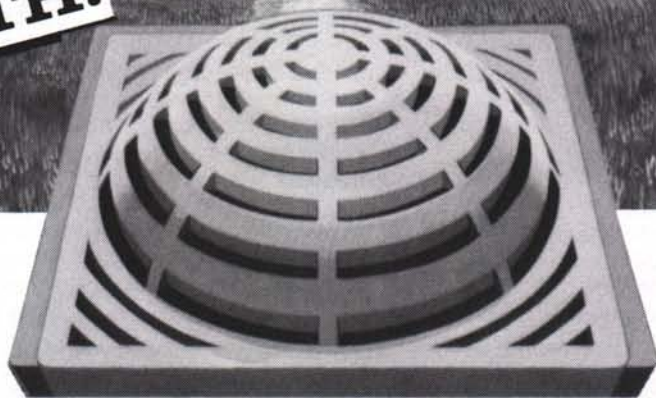
the greens. The greens are irrigated with a Rain Bird manual system only when the leaf tips begin to curl. They are also dragged each morning to remove the dew. We irrigate heavily and infrequently to encourage the roots to grow down ten or more inches. "The sand provides good percolation so we have little to no runoff on these level surfaces," Tinsley adds. To keep percolation rates up, the greens are aerified, the cores removed and then toppedressed with sand. "We've switched to a finer (50 sieve) sand to reduce the resistance of the sand on the bowls," Tinsley points out.

Maintaining the greens is a full-time job for one person in both Beverly Hills and Lakeland. "If you have bowling greens, you have to maintain them correctly," says Tinsley. The Beverly Hills Parks Department lets the croquet club use one of the three bowling greens to help justify the expense to the rest of the taxpayers.

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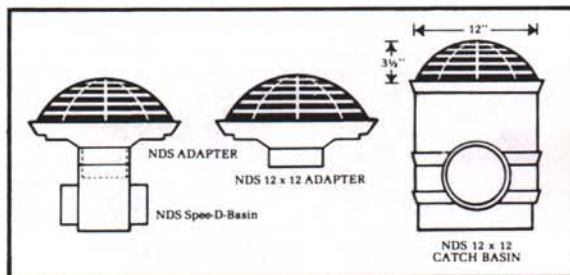
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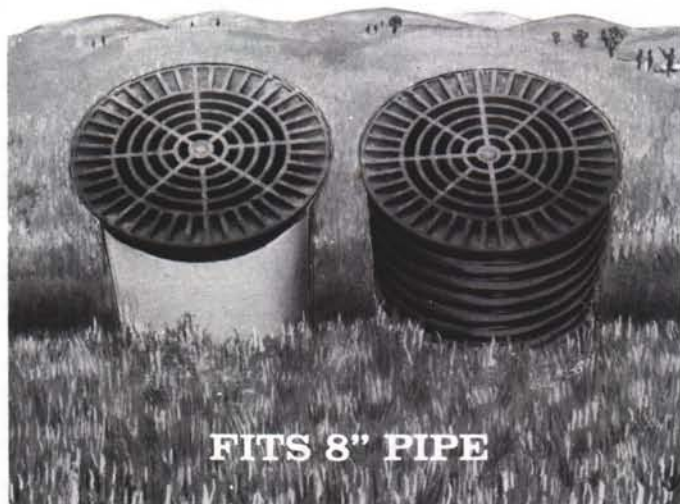
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Lawn Bowling and Croquet

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Luke Majorki, general manager of golf course maintenance at PGA National in Palm Beach Gardens, FL, has become an expert on croquet greens since the USCA moved there this year. When USCA was looking for a location where its headquarters could be next to tournament quality greens, the PGA seemed natural. The home of the PGA of America, the organization of golf club professionals, already had four golf courses, 19 tennis courts and a health and racquet club. When snow starts falling up north, club professionals pack their bags for PGA National to keep their game in top form, to compete in qualification tournaments and to relax in the Florida sunshine. The competitive golf pros enjoy testing their skills on nearly every sport and croquet was one both USCA and PGA felt was a natural.

Majorki explains, "Collin Wright, vice president of PGA National, kept saying in meetings that croquet would be a nice addition to the facility. I didn't take him seriously until he asked me how quickly I could build croquet greens if USCA moved down from New York. Collin and Jack (Osborn) had discussed the idea at length and they had a site in mind. So, I just asked when do you need them built? That was how the USCA made PGA National its new home."

With 25 years of experience in maintaining, owning and building golf courses, cro-



Sprigs of Tifgreen hybrid bermudagrass are scattered across the sand greens at Roxbury Park.

quet was a new challenge for Majorki and he jumped in with both feet. He quickly learned the difference between a golf green and a croquet green. "When they say flat, they mean flat!" remarks Majorki. Flat also meant special drainage and Majorki immediately thought about adapting the United States Golf Association (USGA) specifications for golf greens for a flat croquet green.

The decision was made to build five greens. This would provide USCA and the guests at PGA National with the largest croquet complex in the country. A site across from the PGA Sheraton Resort Hotel was selected and a number of trees were moved. Construction got underway in August 1986.

The area, slightly larger than one acre, was graded to provide a level subsurface.

More than 500 feet of drainage pipe were installed in a herringbone pattern on each of the five greens and covered with four inches of washed pea gravel. Ten inches of medium-sized sand was spread over the gravel and carefully levelled and rolled to a flat grade. After tilling in peat moss into the top few inches of sand, the greens were again levelled and rolled to a flat grade. Before the Tifgreen 328 was sprigged into the greens, the entire area was fumigated with methyl bromide. The courts were bordered with Tifway 419 sod.

Before the greens were five months old, the bermudagrass was overseeded with Derby perennial ryegrass in preparation for the first match to be held on the greens between the U.S. and England. For the next few

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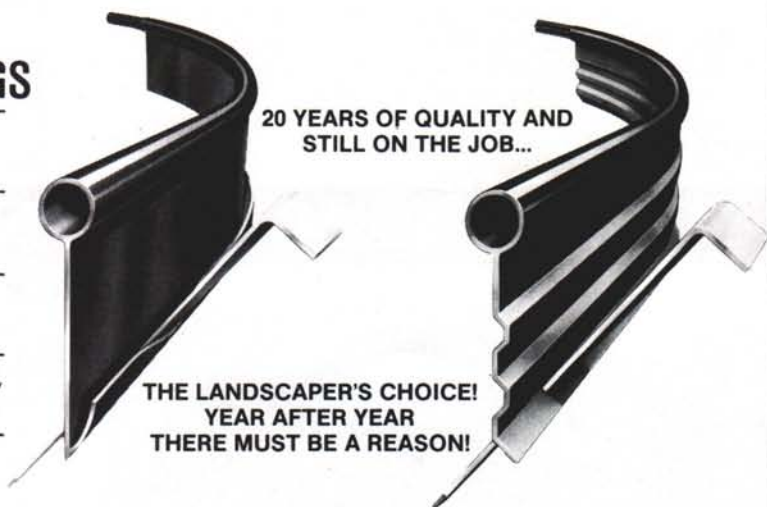
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The sprigs are crimped and rolled into the flat sand surface.

months the greens were verticut and topdressed lightly twice a week to obtain a smooth, firm surface. "It really takes a green a year to mature," explains Majorki, "but we didn't have that luxury. We had to speed up the greens by using Milorganite to absorb the winter sun and applied nearly 12 pounds of nitrogen as IBDU to push the ryegrass along." Majorki applied Subdue or Alliette every two weeks to prevent pythium from attacking the young, tender ryegrass.

The USCA chose the Challenge Cup between the U.S. and England for the grand opening of its new headquarters and greens. "It was like a dream come true," exclaimed Osborn. PGA National has opened a croquet pro shop next to the greens and pro-

vides a regular schedule of classes. Business has been brisk reports Majorki. "I had to assign Tom Smith to the greens full time to keep them in a condition that represents the best of the U.S.," explains Majorki.

"We have seen no signs of compaction so far," Majorki reports. "When we do, we'll increase our frequency of aerification and remove the cores before topdressing." Majorki uses a unique combination of bermudagrass and bentgrass on some of the greens on the golf courses. The Tifgreen does not go completely dormant in the winter due to the mild Palm Beach climate. Majorki has also found that about 40 percent of the bentgrass survives the summer heat. "We can maintain a mixture of the two grasses throughout the year if we want to." Major-

ki is hesitant to try the mixture on the croquet greens since it would require doubling his fungicide applications. "The ryegrass needs about half the disease control when it's mowed at 3/16 inch."

"Croquet is getting away from being just a rich man's game," says Majorki. "If a golf course has a flat area near the clubhouse, a good superintendent can build a croquet green for about the same cost as a golf green and give his members an entirely different sporting experience." If he makes the green 120 by 120 feet and adds the ditches and banks for bowling, he has given his membership two more sports besides golf. The point is the golf course superintendent has the skills to build and maintain these greens. By doing so, his club benefits and membership enjoys two more sports that were once available only to the most affluent. ☉

Editor's Note: For further information on croquet and bowling green construction and maintenance contact the following associations. American Lawn Bowls Association, Earl Torango, secretary-treasurer, 11660 S.W. King George, King City, OR 97224, (503) 639-9178. United States Croquet Association, Jack Osborn, president, 500 Avenue of Champions, Palm Beach Gardens, FL 33418, (305) 627-3999. Dr. Edgar Haley's book, Construction of the Lawn Bowling Green is available for \$10 from Rudi Tolnay, 16630 Roca Drive, San Diego, CA 92128.

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U.S. STADIUMS FOR 1994 WORLD CUP SOCCER SELECTED

Eighteen stadiums have been included in a proposal to the Federated Internationale de Football Association (FIFA) in Switzerland to host the World Cup soccer matches in 1994, says James Trecker, press officer for World Cup Soccer 1994. Brazil, Chile and Morocco have also submitted proposals for 1994.

Every four years FIFA selects 24 countries to participate in the international tournament. Italy will host the 1990 World Cup. The four countries submitted their proposals to FIFA in September. A FIFA committee will inspect the facilities in each country and make a decision on the host country by June 1988.

"Our proposal was 500 pages long and took a great amount of work to prepare," said Trecker. "We visited stadiums in dozens of cities across the country while preparing the proposal. While the matches will be played in 12 different stadiums divided by region, we picked six backup facilities and remain open to new stadiums that may be built in the seven years between now and the World Cup."

Trecker expects FIFA to inspect the stadiums on the U.S. proposal this coming April. "Every stadium has already signed an agreement to meet FIFA requirements," he states. "That includes natural turf and fields large enough for international play. The committee

is also interested in hotels, transportation and other services available to the teams."

The 18 stadiums are divided into four regions. There are five stadiums in the Northeast, including J.F.K. Stadium and Franklin Field in Philadelphia, PA; R.F.K. Stadium in Washington, DC; Palmer Stadium at Princeton University in Princeton, NJ; and the Navy Marine Corps Stadium at the Naval Academy in Annapolis, MD.

Four stadiums in Florida were picked for the Southeast matches. They include the Orange Bowl and Joe Robbie Stadium in Miami, Tampa Stadium in Tampa, and the Citrus Bowl in Orlando. The Midwest matches will be held at any of four stadiums, including Arrowhead Stadium in Kansas City, MO; the Cotton Bowl in Dallas, TX; Soldier Field in Chicago, IL; and a yet-to-be-built stadium in Blaine, MN, known as the Minnesota Sports Stadium.

Western matches will be played either at the Rose Bowl in Pasadena, CA; the Los Angeles Coliseum in Los Angeles, CA; Husky Stadium at the University of Washington in Seattle, WA; Parker Stadium at Oregon State University in Corvallis, OR; or the Sam Boyd Silver Bowl in Las Vegas, NV.

"We firmly believe the U.S. can present the best World Cup ever held," says the confident Trecker. It would be the first time the World Cup matches would be played in this

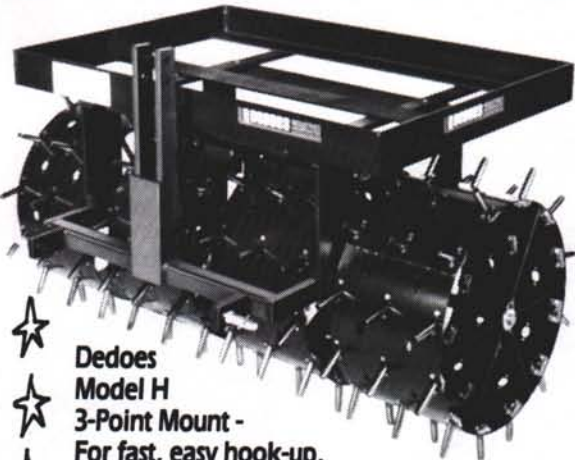
country. Brazil hosted the matches in 1950 and Chile in 1962. Morocco has never hosted the event. "We received tremendous support from the stadium managers," says Trecker, "and expect that enthusiasm to spread if FIFA selects the U.S. in June."

NFL STRIKE TAKES TOLL ON PRACTICE FACILITIES

The two-a-day practices the National Football League teams used to mold green substitutes into professional players is taking its toll on practice fields, according to Sam Monson. Monson, who is facility supervisor at the Minnesota Vikings headquarters and training center in Eden Prairie, MN, explains, "We got a double dose of wear this year on our practice fields. We basically had to train two teams this year. Now we'll probably have more two-a-days to help the regulars get back into the groove since the walkout has ended."

Monson even noticed that the substitutes caused a different type of wear to the fields than the regulars do. "Where the regular players will plant their feet and tear the turf when they pivot, the subs tend to slide, ripping up turf as they go," he explained. It's a lot easier to fix a divot than a big tear. I'll be glad to have the regulars back."

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LAKE LEVEL, SOIL HEATING ADD CHALLENGE TO SOLDIER FIELD PROJECT

Before the Chicago Park District makes its final decision about replacing Astroturf with natural turf, it wants to determine the cost of correcting two related problems—preventing water from nearby Lake Michigan from flooding the field through the storm sewer system and keeping the turf growing during the winter.

"We are not willing to spend \$5 million to correct these problems just to have natural turf," explained Bob MegQuir, project manager for the park district. "Fortunately, it looks like we have affordable solutions to both problems by using a PAT System. Dr. Daniel, Laurel Meade, David Heiss (all associated with PAT) and Roger Bossard (consultant on the project and grounds manager at nearby Comiskey Park) have developed ways to isolate the field from the storm sewer system by providing for alternate disposal of excess water on the field into the sanitary sewers."

A system to heat the field soil in the winter has also been proposed. It entails circulating hot water in pipes installed 18 inches apart across the field a few inches below the surface. This system has been used successfully by Scottish sports turf architect John Souter in England. The PAT field at Mile

High Stadium in Denver, CO, has electric resistance heating cables in the field to melt snow and prevent the turf from going dormant during the winter. A hot water heating system was also installed at Findley College in Findley, OH, in 1986 by Daniel and Meade.

Regardless of the outcome, demolition of the current surface at Soldier Field will begin in mid-January and be completed by May, says MegQuir. "By the time the Bears play their exhibition games in August, they will be playing on a new field."

The park district has also announced it is considering building 56 more skyboxes to add to its current 60 at Soldier Field. The Chicago Bears will share the cost and the income from the additional skyboxes.

NEW JERSEY VOTES ON BASEBALL STADIUM

This month the voters of New Jersey will decide whether or not they will allow the sale of \$150 million in bonds for construction of a baseball stadium near the Meadowlands complex. The state legislature approved a bill in September allowing up to \$185 million for the project.

If passed, the bonds must be sold by 1991, and they can't be issued until a professional baseball franchise guarantees it will occupy the new stadium. The open 45,000-seat

stadium will be operated by the New Jersey Sports & Exposition Authority (NJSEA), the same organization that runs Meadowlands Racetrack, the Brendan Byrne Arena and Giants Stadium.

NJSEA has been looking for an expansion team or existing franchise for the stadium since 1984 when it was first proposed. Negotiations with one team at the time fell through, but the authority continued to pursue the idea.

The racetrack generates enough surplus to help finance the debt for construction of the arena and Giants Stadium, but it could not cover the cost of construction for the baseball stadium. For this reason, tax-exempt municipal bonds are needed.

CHEVRON AND SUMITOMO AGREE TO JOINT VENTURE

Chevron Chemical Company and Sumitomo Company Ltd. of Japan have agreed in principle to form a joint venture company to develop and market agricultural chemicals in the United States. The venture grew out of several years of close ties between the two companies in the development of four new products which should reach the turf and landscape markets beginning in 1988. They include the growth regulator Prunit, an insecticide called Danitol, Spotless and Sumagic.

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Sun Devil Stadium: University Gridiron Grows Up

Carved between two mountain buttes in the desert Southwest is an important training facility for aspiring professional football players. Ironically professional football plays no part in its construction or maintenance. Sun Devil Stadium in Phoenix, AZ, is the sole responsibility of Arizona State University (ASU) in Tempe. The fact that this stadium has become one of the most recognized in college football and may one day serve a professional football team is purely the result of the foresight of individuals in the athletic and physical plant departments at the university.

There is no minor league in football. Those athletes whose desire in life is to be professional football players have just one way to get there, by going to school and demonstrating their prowess on the gridirons at colleges and universities in small towns and cities across the U.S. These fields are the stage where football careers begin for some and end for others. They are the proving grounds and training facilities for a multi-billion dollar industry. But they are also a tremendous source of national recognition for American colleges and universities, a factor that attracts students and endowments to campuses.

When Sun Devil Stadium was built in 1959, television was still in its infancy and national recognition for college teams was hard to gain. ASU trustees at the time weren't thinking about television revenues or professional football. Their primary concern was providing a football facility in which student athletes could compete successfully with other colleges in the Western Athletic Conference. The football stadium would also be an important part of fall student activities and the only large football stadium in Phoenix for local sports fans.

An old landfill situated between two buttes next to the campus was chosen as the site for the stadium since it formed a natural bowl. To widen the bowl, construction crews had to blast away tons of rock. When they finished blasting, the floor of the stadium was still bowl-shaped with the center over the landfill. By the time thousands of yards of local caliche (high in lime content) soil were graded to an 18-inch crown, the soil in the center was more than three feet deep while that on the sidelines was only six inches deep. Common bermudagrass was installed and irrigated with quick coupler sprinklers located on the sidelines.

For more than 15 years the grounds crew had to contend with settling in the center of the field and dry spots along the sidelines, explains Don Dickerman, assistant director of physical plant and former grounds manager. "We had to do a lot of hand watering and topdressing to keep the field in



Sun Devil Stadium at Arizona State University in Tempe, AZ.

shape." A serious nutsedge problem developed in the alkaline soil. The soil got worse as the salts from the irrigation water and fertilizers built up. Leaching the salts out of the soil was just about impossible since the drainage system was so poor. Despite these challenges, Dickerman managed to produce a quality field for the Sun Devils every year.

In 1970, a group of independent businessmen in the state approached ASU about using Sun Devil Stadium for a new, post-season college bowl game they had named the Fiesta Bowl. The ASU Sun Devils had established an impressive record in the conference. The Fiesta Bowl committee wanted to stage a holiday season contest between the champion of the Western Athletic Conference, which ASU had been for several years, and a football powerhouse from another conference. The Fiesta Bowl com-

mittee reached an agreement with ASU in 1971 and the first game was held that winter.

Dickerman, a 1962 graduate of the turfgrass management program at the University of New Mexico, Las Cruces, went to the directors of both the athletic and physical plant departments in 1972 about the condition of the field. He wanted to replace the caliche soil with three inches of sand on top of the best clay loam he could find, fumigate the new soil to kill any nutsedge tubers and install a new hybrid bermudagrass called Santa Ana. The bermudagrass had been developed in the late '60s by Dr. Vic Youngner of the California Extension Service. It has better wear tolerance than common bermudagrass, tolerates salty soils and smog, and retains its dark green color long into the cool football season.

Dickerman was able to take advantage